

Unit 3: Ch. 10, 11, 12:

Samples

- Idea 1:

- We select a sample of a population.

- Idea 2: Randomize

- Helps us to make sure that on average, sample looks like rest of population.

- Idea 3: Sample Size

- How large does sample need to be for it to accurately represent the population? *Big enough, for now.*
- Sample size is what matters, not percentage of population.

- Bias
 - Sampling method that over- or under-represents something.
 - We try to ask good questions and use proper sampling techniques to reduce bias as much as possible.
 - Randomness greatly reduces bias in sampling methods.
- Populations and Samples:
 - Parameters \rightarrow Populations
 - Statistics \rightarrow Samples

Name	Statistic	Parameter
Mean	\bar{y}	μ
Standard deviation	s, s_x	σ, σ_x
Proportion	\hat{p}	p

- Sample Types:
 - Simple Random Sample (SRS)
 - Each person has an equal chance of being selected
 - Each combination of people of people has an equal chance of being selected.
 - Sampling frame → list of individuals from whom sample is drawn
 - To get SRS, use sampling frame and random numbers to select individuals.
 - Sampling variability → sample-to-sample differences that exist due to random process
 - Stratified Random Sample:
 - Break population into groups of similar individuals, called strata
 - Within each strata, SRS is performed.
 - Samples taken within each strata vary less, so our results are more precise.

- Cluster Sampling:
 - Break population into representative clusters to make sampling more practical.
 - Select clusters at random and survey everyone in cluster.
- Multistage Sampling:
 - Combination of several sampling types.
- Systematic Samples:
 - Select individuals in a systematic way (every 5th thing, every 20th thing, etc.)
 - To ensure it is representative, must start sample in random place.

We need to survey a random sample of the 300 passengers on a flight from San Francisco to Tokyo. Name each sampling method described below.

- a) Pick every 10th passenger as people board the plane.
- b) From the boarding list, randomly choose 5 people flying first class and 25 of the other passengers.
- c) Randomly generate 30 seat numbers and survey the passengers who sit there.
- d) Randomly select a seat position (right window, right center, right, aisle, etc.) and survey all the passengers sitting in those seats.

a) systematic

b) stratified

c) simple

d) cluster